Life goals predict environmental behavior: Cross-cultural and longitudinal evidence

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Abstract

Prioritizing intrinsic life goals (self-development, community involvement, relationships) rather than extrinsic ones (money, fame, image) is said to foster not only personal wellbeing, but also pro-social behavior such as protecting the environment. We explored concurrent and prospective links between intrinsic (versus extrinsic) life goals and self-reported environmentally responsible behavior, using correlational and longitudinal data from adult participants in a mass consumer society (UK) and a fast developing nation (Chile). In both countries, the importance of intrinsic (versus extrinsic) life goals was associated cross-sectionally with environmentally responsible behavior, even after controlling for possible effects of environmental worldviews and environmental identification. In longitudinal analyses, life goals prospectively predicted environmentally responsible behavior over a two-year period, whereas, rather unexpectedly, environmental worldviews and environmental identification did not. We conclude that focusing on intrinsic, rather than extrinsic, life goals may be important not just for individuals' well-being, but also for the well-being of future generations.

Key words: extrinsic/intrinsic life goals; environmental behavior; environmental worldviews; environmental identification; longitudinal research

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1. Introduction

Climate change and global warming have been portrayed as the biggest human challenges of the 21st Century (United Nations Development Programme, 2007). The future of the environment is in serious danger, mainly due to human consumption activity (Brown & Kasser, 2005; Commission for Environmental Cooperation, 2002; Crompton & Kasser, 2009; Sheldon, Nichols, & Kasser, 2011). In this process, peoples' life goals and aspirations are thought to have played a key role that deserves a deeper understanding, so as to protect the well-being of future generations (Crompton & Kasser, 2009; Tanner, 1999).

A few studies have suggested that life goals might have implications for environmental behaviors. For example, it has been found that people who attach a higher relative importance to extrinsic values and life goals tend to engage in more damaging environmental behavior (Banerjee & McKeage, 2004; Brown & Kasser, 2005; Richins & Dawson, 1992; Sheldon & McGregor, 2000). However, the existing evidence has been mostly limited to a small number of cross-sectional studies, conducted among students and other young people in primarily Western nations, and it remains unclear to what extent intrinsic (versus extrinsic) life goals are prospectively implicated in environmentally responsible behavior, over and above the effects of other likely predictors such as a pro-environmental worldview and a sense of identification with the natural environment. Here, we explored cross-culturally whether intrinsic (versus extrinsic) life goals would predict environmentally responsible behavior, over and above any effects of environmental worldviews and environmental identification, among adults in the UK and Chile. Moreover, we used both cross-sectional and longitudinal data, in order to provide evidence for both the magnitude and the direction of the relationships observed.

1.1. Environmental Behavior

Research has shown that several environmental problems (e.g., global warming, air pollution, water shortages) are rooted in human behaviors (Steg & Vlek, 2009; Vlek & Steg, 2007). Here, following Steg and Vlek (2009), we define environmental behavior broadly "as all types of behavior that change the availability of materials or energy from the environment or alter the structure and dynamics of ecosystems or the biosphere" (p. 29). In this sense, pro-environmental behavior "refers to behavior that harms the environment as little as possible, or even benefits the environment" (p. 29). Factors influencing pro-environmental behaviors have been studied from different theoretical perspectives (Steg & Vlek, 2009). In the current contribution, we will follow a social psychological approach, thereby focusing on three potential predictors: intrinsic (vs. extrinsic) life goals, environmental worldviews, and environmental identification.

1.2. Extrinsic (Versus Intrinsic) Life Goals

Materialism is a value system that places strong emphasis on the acquisition of money, fame, and image as a pathway to happiness and well-being (Dittmar, 2008; Kasser & Kanner, 2004; Richins, 2004; Richins & Dawson, 1992). Nowadays, the most common approaches in the materialism literature have focused on values and beliefs (Richins & Dawson, 1992) and on extrinsic (versus intrinsic) life goals and aspirations (Kasser & Ryan, 1993, 1996; Vansteenkiste, Duriez, & Soenens, 2008). The latter has become the most influential approach to studying materialism in mainstream psychology (Dittmar, 2008). Kasser and Ryan (1993, 1996) developed the Aspiration Index to assess the importance a person places on extrinsic life goals (e.g., fame, image, and wealth) relatively to intrinsic life goals (e.g., self-development,

relationships, community involvement, and health). The higher the relative importance people attach to extrinsic life goals, the stronger is their materialistic orientation.[1]

In recent years, correlational studies have explored links between extrinsic life goals (or materialistic values) and environmentally damaging behavior. Richins and Dawson (1992) found, in a sample of US households, that people with a more materialistic orientation were less likely to buy used goods or to use bicycles instead of cars, also showing less ecologically aware behaviors. In a study of UK households, Gatersleben, White, Abrahamse, Jackson, and Uzzell (2009) found that people scoring higher in materialism attached greater importance to possessions associated with high energy use, such as TVs, mobile phones and cars, attached less importance to energy-conserving processes, and were less willing to change a range of ecologically irresponsible behaviors. In samples of US adolescents and adults, Brown and Kasser (2005) found that an intrinsic (versus extrinsic) value orientation related positively to ecologically responsible behavior. Among Hong Kong students and adults, Ku and Zaroff (2014, Studies 1 and 2) found that intrinsic (vs. extrinsic) life goals also predicted participants' self-reported willingness to pay to protect the environment. Studying common social dilemmas among young students in the US, Sheldon and McGregor (2000) explored the association between life goals and harvesting strategies, finding that more extrinsically oriented students would consume limited ecological resources at more unsustainable rates. In a sample of American students, Banerjee and McKeage (1994) found that environmentally friendly

[1] In a recent meta-analysis, Dittmar, Bond, Kasser, & Hurst (2014) found that measuring materialism through an *absolute* measure (e.g. ratings of the importance of money) or a *relative* measure (e.g. assessing how important materialistic goals are in comparison to a variety of other types of goals, such as personal relationships, community involvement, or spirituality) may lead to different results. They concluded that absolute measures focused on the acquisition of money and possessions alone may not capture the full meaning of materialism. In contrast, they showed that relative goal measures, such as the Aspiration Index, were more strongly related to well-being.

consumption was negatively related to materialism. Furthermore, in an analysis comparing 20 wealthy nations, Kasser (2011) found that countries placing a higher priority on the value of *harmony* (intrinsic) versus the value of *mastery* (extrinsic), tended to have lower CO2 emissions, after controlling for effects of national wealth. A recent meta-analysis (Hurst, Dittmar, Bond, & Kasser, 2014) supported these claims and found significant, medium-sized associations between materialistic values and both environmental attitudes ($\rho\hat{} = -.28$) and behaviors ($\rho\hat{} = -.32$).

The studies described above provide supportive evidence for a link between life goals or values and environmental behavior, but they are all based on one-shot correlational designs, making it impossible to untangle the exact direction of the relation between these two variables. Do intrinsic (versus extrinsic) life-goals lead to an increase in ecologically responsible behavior, or does ecologically responsible behavior lead to a stronger endorsement of intrinsic life-goals? We are aware of just three studies to date that have used an experimental design to address this question: Vansteenkiste, Simons, Lens, Soenens, Matos, and Lacante (2004) found that female Belgian college students who had been primed with intrinsic reasons to read a text about recycling showed greater subsequent persistence in learning more about recycling (i.e. going to the library or visiting a recycling plant), compared to those who had been primed with extrinsic or both intrinsic and extrinsic goal-contents. Sheldon et al. (2011) found that American students recommended smaller ecological footprints in a scenario task when they were prompted to think of intrinsic values as characteristically American. Finally, in a simulation task among female Chinese students, Ku and Zaroff (2014, Study 3) found that participants primed with intrinsic goals chose to donate more of their virtual earnings to pro-environmental causes, and participants primed with extrinsic goals chose to donate less, compared to a control group.

These three experimental studies provide valuable first evidence for the causal role of intrinsic (vs. extrinsic) life goals on pro-environmental concerns. However, they also have several key limitations: First, none of these studies actually measured pro-environmental behavior. Both Sheldon et al. (2011) and Ku and Zaroff (2014) focused on environmental decision-making in imaginary scenarios as dependent measures for their experiments. Although Vansteenkiste et al. (2004) included a behavioral outcome measure, this was focused on *learning* about recycling, and they did not measure recycling behavior itself. Thus, research is still needed to assess the causal link between life goals and everyday environmental behaviors. Second, all three experimental studies relied on student samples. Yet, environmental behaviors are likely to differ significantly between adults and younger generations (Hurst et al., 2014; Sparks, Hinds, Curnock, & Pavey, 2014), because adults usually have more freedom and economic resources to make decisions that affect the environment, whereas students' decision power and economic resources are more constrained. Third, experimental studies such as these are well-suited to showing short-term effects of priming intrinsic or extrinsic life goals at particular moments in time, but the results of such studies may or may not generalize to the longer timescales over which patterns of everyday behavior are developed.

Addressing these limitations requires a different methodological approach. Systematic longitudinal research using a cross-lagged design is better suited to disentangling the ongoing, naturally occurring, reciprocal relations between people's pre-existing (rather than momentarily primed) life goals and their *everyday* environmental behaviors, as these unfold over time. Moreover, because such research can be conducted using survey methods, rather than requiring participants to visit a laboratory, it is possible to reach adult populations, who may have greater environmental impact in their everyday lives (for better or for worse) than student populations.

In the research described here, using this naturalistic method further allowed us to compare the predictive role of life goals with that of two other likely predictors of environmental behaviors that we introduce shortly: environmental worldviews (Dunlap, Van Liere, Mertig, & Jones, 2000) and environmental identity (Hinds & Sparks, 2008). Moreover, we were able to test the prospective relations among these constructs over time in two rather different sociocultural and economic contexts: an established mass consumer society in Western Europe (the UK) and a fast-developing nation in South America (Chile).

1.3. Environmental Worldviews

Environmental worldviews reflect people's attitudes, concerns and beliefs regarding the ecological problems the world is currently facing (Dunlap et al., 2000). Research has consistently shown that a *pro-environmental worldview* is associated with more environmentally responsible behavior (Gatersleben, Murtagh, & Abrahamse, 2014; Gatersleben, White, Abrahamse, Jackson, & Uzzell, 2010; Steg & Vlek, 2009). These findings have been confirmed through meta-analyses (Bamberg & Möser, 2007; Hines, Hungerford, & Tomera, 1987) and longitudinal research (Kaiser, Wölfing, & Fuhrer, 1999). Thus, we considered it was important to control for possible effects of environmental worldviews when testing the prospective relations between life goals and environmental behavior in the current research.

1.4. Environmental Identification

Recently, it has been proposed that *social identification* processes may play a key role in people's environmental behavior. Social identity refers to the groups to which a person feels s/he belongs. It includes, for example, group memberships based on gender, ethnicity, nationality, profession, or religion (Tajfel & Turner, 1986). The idea of social identification has been expanded to consider people's sense of belonging to the non-human environment (Crompton &

Kasser, 2009). As a result, the concept of *environmental identification* – an example of an extended self – has emerged, reflecting a person's sense of connection to nature that affects the ways in which s/he perceives and acts in the world (Clayton, 2003).

Because we live in times of disengagement from the natural environment, and people's sense of disconnection with it may lead to detrimental consequences for our planet (Sparks et al., 2014), researchers have shown an increasing interest in the study of environmental identification and its link to environmental behavior (Mayer & Frantz, 2004; Schultz, 2000, 2001). It seems that for people with a high degree of inclusion of the environment in their self, nature has inherent value because it is interconnected with their identities (Schultz, 2000, 2001). For example, Whitmarsh and O'Neill (2010) found that environmental identification was positively associated with several pro-environmental behaviors. Nigbur, Lyons, and Uzzell (2010) reported that pro-environmental self-identity related positively not only to pro-environmental intentions, but also to self-reports of pro-environment behavior. In addition, it has been found that environmental identification is positively correlated with different types of pro-environmental behavior, such as waste, transport and buying behaviors (Gatersleben et al., 2014). However, to our knowledge, only a few correlational studies to date have supported these hypotheses. Therefore, longitudinal evidence is necessary to disentangle the precise direction of the link. Moreover, as with environmental worldviews, we were concerned to establish whether intrinsic (vs. extrinsic) life goals would contribute further to prospective prediction of environmental behaviors after accounting for any prospective effect of environmental identification.

1.5. Contexts for the Present Research: the UK and Chile

As noted in the recent meta-analysis by Hurst et al. (2014), the great majority of research on the link between environmental behavior and life goals to date has been conducted in

developed 'Western' nations, representing a very small portion of the world's population (United Nations Development Programme, 2010). Importantly, people in these nations – compared with less affluent developing ones – nowadays have more knowledge and awareness of the ecological problems the world is facing. For example, people in developing nations may wrongly believe that the only source of environmental problems is pollution (Kurvey, 2014). Moreover, the Environmental Performance Index (Hsu et al., 2014), derived from 20 nation-level indicators of the overarching structure of Environmental Health and Ecosystem Vitality, has shown important differences in environmental performance between developed and developing nations. In addition, a recent report submitted to the United Nations states that "increasing human populations with growing per capita consumption levels" have played a key negative role in environmental sustainability (SNDP, 2013, p. 14). In fact, the world's population has increased faster than ever before, and developing countries have led this process (World Bank, 2014). Thus, understanding the psychological mechanisms underlying environmental behavior among people in developing nations is a key issue for the sustainability of the planet.

Extrinsic and materialistic life goals have been present in developed countries and long-established mass consumer societies – e.g. UK and US – for many years (Dittmar, 2008; Twenge & Kasser 2013). However, some research has begun to explore these constructs in developing countries such Russia (Ryan, Chirkov, Little, Sheldon, Timoshina, & Deci, 1999), India (Dittmar & Kapur, 2011) and Chile (Unanue, Dittmar, Vignoles, & Vansteenkiste, 2014). The case of Chile, a South American country, is especially interesting to study. Its fast economic growth has led to higher GDP per capita (United Nations Development Programme, 2010) which in turn may provide new opportunities for a larger number of people in the country to follow the dangerous messages of global consumer culture and thus to make choices that damage the

natural environment (Brown & Kasser, 2005). Here, we collected data from adult participants in the UK and Chile.

Chile and the UK differ in several respects, such as geography, economic wealth, consumer culture penetration (United Nations Development Programme, 2010; see also Unanue et al., 2014), and environmental performance (Hsu et al., 2014). For example, the 2014 Environmental Performance Index showed that UK ranked 12th with a score of 77.35, whereas Chile ranked 29th with a score of 69.93 (Hsu et al., 2014). Thus, it seems valuable to test our hypotheses among participants in these two very different national contexts. Indeed, Gatersleben, Jackson, Meadows, Soto, and Yan (2012) have found that the link between materialistic values and environmental outcomes did not appear to be universal and might be culturally specific: they found that materialism was a significant predictor of environmental worldviews and ecologically responsible behavior intentions in the UK and in Spain, but not in China. Such findings raise the question to what extent intrinsic (versus extrinsic) life goals may have similar or different consequences in the UK and Chile, especially since no previous research has explored these relationships in a South American context. Therefore, testing the link between life goals and self-reports of actual behavior not only in the UK, a mass established consumer society, but also in Chile, a South American country in fast economic transition, is of much interest.

1.6. The Present Research

Despite some research showing significant associations between intrinsic (versus extrinsic) life goals and environmentally responsible behavior, there is still relatively little evidence to support the idea, and there are important research gaps – mentioned above – that needed to be addressed. In the current research, among samples of UK and Chilean adults, we

sought to extend previous findings into the link between intrinsic (versus extrinsic) life goals and environmentally responsible behavior in the following five ways:

First, because it has been shown that environmental behavior is associated with pro-environmental worldviews, environmental identification as well as intrinsic (versus extrinsic) life-goals, we measured these key variables together for the first time. Doing so allowed us to increase our understanding of their unique and combined contribution to the prediction of environmental behavior. Second, we used a longitudinal design to disentangle the correct temporal sequence in the link between intrinsic (relative to extrinsic) life goals and environmentally responsible behavior, controlling for the other likely predictors that we had measured and allowing for the possibility of reciprocal links among the constructs examined. Third, we tested whether the paths in our model were dependent upon (i.e., moderated by) national context, comparing the UK – an established mass consumer society – and Chile – a fast-growing new economy. Fourth, we studied adult non-student samples. Fifth, and finally, our outcome measure was a composite measure of different everyday environmental behaviors, rather than the more limited measures used in previous experimental studies.

In summary, we tested the following hypotheses in our UK and Chilean samples (see Figure 1):

(H1) A stronger importance attached to extrinsic (relative to intrinsic) life goals will predict lower environmentally responsible behavior both contemporaneously (correlationally) and prospectively (longitudinally).

(H2) Stronger pro-environmental worldviews will predict higher environmentally responsible behavior both contemporaneously (correlationally) and prospectively (longitudinally).

(H3) Stronger environmental identification will predict higher environmentally responsible behavior both contemporaneously (correlationally) and prospectively (longitudinally).

We expected to find comparable support for hypotheses H1 to H3 in samples drawn from both UK and Chilean contexts.

2. Method

2.1. Participants and Procedure

British and Chilean graduates took part in a longitudinal research project on materialism, environmental worldviews, attitudes and behavior where the core measures for the present paper were collected (see also Unanue et al., 2014).[2] In 2010 (T1), respondents were told that the project was part of a longitudinal study and were asked for their consent for future waves (T2 and T3). The British sample were former graduates, recruited through the alumni office of a university in the South East of England. The Chilean sample consisted of adults living in Chile, recruited mostly through the alumni office of a university in Santiago, but also through personal contacts of the first author. Age and gender distributions are shown in Table 1. Statistical analyses revealed that the two samples differed significantly in age ($F[1, 1214]$, $p < .001$), and

[2] The Time 1 data for intrinsic (versus extrinsic) life goals were previously reported by Unanue et al. (2014). None of the other substantive measures reported here have been reported in previous publications.

marginally in gender distribution [$\chi^2(1) = 2.94$) $p = .09$] at T1. Nonetheless, as we will show later on, controlling for these background characteristics did not change the main results reported in our structural models. [3]

In 2010, all participants were sent an introductory email containing a brief description of the study along with a web link to the survey. They provided written consent and were informed that they could withdraw from the study at any point. The purpose of the research was described in broad terms (hence, no deception was involved) and respondents were given the opportunity to receive a summary of the research findings. The first page of the survey contained a brief description of the study, and the second page informed participants of their right to withdraw at any time, as well as assuring confidentiality with regards to their responses. Then, participants were asked to complete the core measures for the present research: materialism, pro-environmental worldviews, environmentally responsible behavior and environmental identification[4]. The final section of the survey assessed demographic details. All questions were compulsory. Within this project, a variety of scales were used, the majority of which are known to have good psychometric properties. The questionnaire was translated into Spanish for the Chilean participants, and equivalence of meaning with the English version was checked through established back-translation procedures (Brislin, 1970).

[3] Following Unanue et al. (2014) and using a standard procedure (Nickerson, Schwarz, Diener, & Kahneman, 2003) to compare incomes (Time 1) between countries with different purchasing power parity (World Bank, 2013a, 2013b), we estimated that the Chilean participants had a slightly (7%) higher average monthly personal income than the UK participants. The average income of the UK sample is located in the highest 20% of the UK national income distribution (Office for National Statistics, 2013) whereas the average income of the Chilean sample is located in the top 10% of the Chilean national income distribution (Ministerio de Desarrollo Social, 2009). Therefore, we can conclude that both samples are moderately, but not perfectly, similar in terms of income.

[4] Some other measures were collected but they are not relevant for the present research (see Unanue et al., 2014).

We followed two rules for collecting T1 data. First, at baseline (2010), we told participants that the online system would be open only until the beginning of July (UK) or September (Chile). Second, we decided in advance to stop collecting data when the number of new responses started declining substantially (after sending several e-mail reminders). We stopped collecting T1 data on the first day that fewer than 2 participants filled our questionnaire. All T1 participants who agreed to participate in further waves were sent an email in 2011 and 2012 containing a new web link to our questionnaires with identical measures. Based on the sample sizes achieved at T1, we decided that in T2 and T3 we would stop collecting data when we reached a minimum of 600 UK participants (or 100 Chilean participants) or the number of new responses started declining significantly. We stopped collecting T2 data on the first day that only one participant answered our questionnaire. Similarly, we stopped collecting T3 data on the first day that no participants completed our survey. Thus, data were obtained for a three-wave longitudinal survey (T1 = 2010, T2 = 2011 and T3 = 2012).

In total, 958 British adults completed Wave 1, 594 completed Wave 2 and 610 completed Wave 3. Of these, 461 adults (48.12% of the T1; 59% female) aged from 20 to 77 years at T1 (Mean age = 45.14; SD = 14.06) completed all three waves in the UK. In Chile, 257 adults completed Wave 1, 115 completed Wave 2 and 114 completed Wave 3. Of these, 76 adults (29.6% of T1 sample; 47% female) ranging in age from 22 to 71 years at T1 (Mean = 36.87; *SD* = 10.21) took part in all three waves in Chile. In our longitudinal analyses, we included only those participants that answered the three waves in the UK (i.e., 461) and in Chile (i.e., 76). Thus, we did not have missing data in our longitudinal analyses. Moreover, because all survey questions were compulsory, we did not have to deal with missing data due to incomplete answers neither in the cross-sectional nor in the longitudinal models.

2.2. Measures

2.2.1. Extrinsic (versus intrinsic) life goals. This construct was modeled as a latent variable, using a shortened, 30-item version of the *Aspiration Index (*Kasser & Ryan, 1993, 1996) to assess the importance of different life goals. We measured six categories of aspirations using five items within each category. Aspirations are either extrinsic (money, image, fame) or intrinsic (self-development, community involvement and affiliation). We asked people to rate how important each goal is to them personally in a scale from 1 to 7. Example items are *To be a very wealthy person* (money), *To have my name known by many people* (fame), *To successfully hide the signs of aging* (image), *To grow and learn new things* (self-development), *To have good friends that I can count on* (affiliation), and *To work for the betterment of society* (community involvement). To obtain the relative importance placed on extrinsic aspirations compared to intrinsic ones, we followed Duriez, Vansteenkiste, Soenens, and De Witte (2007). First, an individual's overall mean score was subtracted from each individual item. Second, the intrinsic items were reversed and an overall extrinsic versus intrinsic (E/I) value score was computed by averaging the extrinsic and the (reversed) intrinsic scales. More positive scores reflect a tendency to prefer extrinsic rather than intrinsic life goals. Cronbach's alphas in the three waves were good, ranging from .71 to .74 in the UK and from .81 to .82 in Chile. For our structural equation models, following the advice of Little, Cunningham, Shahar, and Widaman (2002), we created three item parcels to be used as indicators for the latent variable. Subscales were computed for each of the six life-goals, and each item parcel employed one extrinsic and one (reversed) intrinsic subscale.

2.2.2. Pro-environmental worldviews. We used the *New Ecological Paradigm* scale (NEP; Dunlap et al., 2000), a 15-item Likert-type scale designed to measure environmental

worldviews,[5] reflecting concerns and beliefs towards the environment. Examples items are "*We are approaching the limit of the number of people the earth can support"* and "*Humans have the right to modify the natural environment to suit their needs"* (reversed). Participants rated these statements from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alphas in the three waves were adequate, ranging from .79 to .80 in the UK and from .67 to .72 in Chile. For structural equation modelling, we combined the items into three different parcels.

2.2.3. Environmental identification. We used the *Environmental Identity* scale (Hinds & Sparks, 2008), a 3-item Likert-type measure designed to evaluate an individual's identification with the natural environment. An example item is "*For me, engaging with the natural environment gives me a greater sense of who I am"*. Participants rated each item from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alphas in the three waves were good, ranging from .84 to .87 in the UK and from .80 to .83 in Chile. We modeled environmental identification using the 3 items as separate indicators.

2.2.4. Environmentally responsible behavior. We created a brief, 10-item *Environmentally Responsible Behavior* index using items from the General Ecological Behavior questionnaire (GEB; Kaiser & Wilson, 2004), a scale designed to measure different kinds of environmentally friendly and unfriendly behaviors. Examples are "*I drive my car in or into the city, even when there are other forms of transport"* or "*I boycott companies with an unecological background"*. Following the recommendations of Kaiser et al. (1999), we selected which behaviors to measure according to their difficulty, focusing on behaviors of an average difficulty level. A group of graduate students and faculty from the School of Psychology at a university in

[5] Researchers in the field have often labeled this scale as "pro-environmental attitudes". However, following the original scale authors, we believe that the items of this scale are better interpreted as measuring environmental worldviews than attitudes.

the South East of England ranked from 1 (never) to 5 (always) how often they performed each of 50 environmental behaviors. We asked them *"For the following 32 behaviors, please indicate how often you perform them"* or *"For the following 18 behaviors, please indicate whether you perform them or not"*. Then, we excluded those behaviors that were regularly and easily followed (more that 65% of responses), as well as those behaviors that were most difficult to follow (less than 35% of responses). Thus, in order to focus on behaviors with average difficulty we chose the 10 behaviors (e.g., energy conservation, mobility and transportation, waste avoidance, lower consumerism, recycling, social behaviors toward conservation) that were followed with average difficulty (around 50% of responses). We modeled environmentally responsible behavior by combining these behaviors into three different parcels.

2.2.5. Environmental knowledge. In order to control for possible confounding effects of environmental knowledge (e.g., Meinhold & Malkus, 2005), we also developed an environmental knowledge measure, using the Environmental Knowledge Scale originally developed by Frick, Kaiser, and Wilson (2004) and following the suggestions of Kaiser et al. (1999). Therefore, environmental knowledge at T1 was controlled for. Example items are "*The world population today is 6 billion. What will the world population be in the year 2025, approximately*?" Or "*To travel 1 km (1 mile), how much more energy is consumed per person by car as compared to by train?"*. In building this measure, we followed the same procedure as we used for our pro-environmental behavior measure described above.

3. Results

3.1. Cross-Sectional Analyses

We conducted multi-group structural equation modeling using MPLus 7.1 (Muthén & Muthén, 2013) software to assess the hypothesized associations between intrinsic (versus

extrinsic) life goals, environmental worldviews, environmental identification and environmentally responsible behavior, using Time 1 data from the UK and Chile. We modeled all constructs as latent variables using three indicators per factor as described above. We used latent variables to reduce the biasing effects of measurement error (Finkel, 1995), thus providing more accurate estimates of the parameters that test our hypotheses.

Descriptive statistics and inter-correlations for all the study variables are shown in Table 1. In these and in the subsequent longitudinal analyses, all variables showed approximately normal distributions (values of skew ranged from –.79 to +.53; values of kurtosis ranged from –.93 to +1.66). Few outliers were detected (less than 2.8% for all variables analyzed), and none were deleted from our analyses. Based on the recommendations of Hu and Bentler (1999) and Kline (2005), we assessed model fit using the Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI). We combined the authors' recommendations and interpreted values of RMSEA < .06 (or < .08), and CFI > .95 (or > .90) as evidence of good (or acceptable) fit. No post-hoc modifications were made to the models presented. In initial analyses, we controlled for environmental knowledge, age and gender in both samples, allowing all these variables to covary and to predict environmentally responsible behavior. However, including these control variables did not affect our main results.[6] Therefore, for simplicity, we have excluded these variables from the analyses reported here.

3.1.1. Measurement model. First, we tested a four-factor multi-group measurement model of intrinsic (versus extrinsic) life goals, environmental worldviews, environmental identification and environmentally responsible behavior. We allowed all variables to covary

[6] Environmental knowledge was a significant positive predictor of environmentally responsible behavior in the UK ($\beta = .11$, $p < .01$) but not in Chile ($\beta = .06$, $p = .43$). Female gender was a significant positive predictor of environmentally responsible behavior in the UK ($\beta = .09$, $p < .05$) but not in Chile ($\beta = .06$, $p = .38$). Finally, age

freely in both samples, but we constrained all the factor loadings to be equal across samples. All factor loadings were significant ($p < .001$), with standardized values ranging from .61 to .90 in the UK and from .61 to .92 in Chile, and the model showed a good fit to the data: $\chi^2(112) = 372.91$, $p < .001$, CFI = .95, RMSEA = .06. Since the model with constrained loadings fit the data well, we considered it acceptable to assume invariance of factor loadings across the two countries, and we maintained these constraints in all the structural models reported below.

To gain a first insight in the relative importance of the three predictors of environmentally responsible behavior, we considered the latent bivariate correlations between the four constructs of the measurement model. These were as follows: Life goals and environmentally responsible behavior (UK: $r = -.52$, $p < .001$; Chile: $r = -.33$, $p < .001$); pro-environmental worldviews and environmentally responsible behavior (UK: $r = .52$, $p < .001$; Chile: $r = .40$, $p < .001$); environmental identification and environmentally responsible behavior (UK: $r = .48$, $p < .001$; Chile: $r = .44$, $p < .001$). Thus, the concurrent associations between our core variables ranged from medium to large in magnitude (Cohen, 1992).

3.1.2. Structural model. We then created a structural model to test our hypotheses (see Figure 1). We estimated a multigroup model in which extrinsic (versus intrinsic) life goals, pro-environmental worldviews, and environmental identification were allowed to predict environmentally responsible behavior. We allowed the three predictor variables to covary. Initially, we allowed all the structural paths to vary freely across the two national samples. This structural model was statistically equivalent to the measurement model with constrained loadings, and so fit indices were identical. Results are shown in Figure 2.

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was a significant negative predictor of environmentally responsible behavior in the UK ($\beta = -.11$, $p < .05$) but not in Chile ($\beta = -.07$, $p = .34$).

Extrinsic (versus intrinsic) life goals were a significant negative predictor of environmentally responsible behavior, both in the UK ($\beta = -.35$, $p < .001$) and in Chile ($\beta = -.30$, $p < .001$), giving empirical support to our first hypothesis. Further, pro-environmental worldview was a significant positive predictor of environmentally responsible behavior in the UK ($\beta = .32$, $p < .001$) and marginally so in Chile ($\beta = .18$, $p < .10$), giving empirical support to our second hypothesis. Finally, environmental identification was a significant positive predictor of environmentally responsible behavior both in the UK ($\beta = .22$, $p < .001$) and in Chile ($\beta = .34$, $p < .01$), giving empirical support to our third hypothesis.

Additionally, extrinsic (versus intrinsic) life goals were negatively correlated with pro-environmental worldviews, significantly in the UK ($\beta = -.29$, $p < .001$) and marginally in Chile ($\beta = -.14$, $p < .10$). Extrinsic (versus intrinsic) life goals were negatively correlated with environmental identification in the UK ($\beta = -.35$, $p < .001$), but not in Chile ($\beta = -.03$, $p = .77$). Finally, pro-environmental worldviews were positively correlated with environmental identification both in the UK ($\beta = .45$, $p < .001$) and in Chile ($\beta = .54$, $p < .001$).

Finally, we tested a model where we constrained all the covariances between our predictors and all the corresponding paths from our three predictors to environmentally responsible behavior to be equal across samples. This model continued to show a good fit: $\chi^2(118) = 386.43$, $p < .001$, CFI = .95, RMSEA = .06. However, the model fit decreased significantly in comparison with a model with only loadings constrained ($\Delta\chi^2(6) = 13.52$, $p < .05$). Inspection of all paths and covariances revealed that only the covariance between life goals and environmental identification differed significantly between the UK and Chile. Thus, we unfroze this covariance. This partially constrained model showed a good fit, $\chi^2(117) = 378.58$, $p < .001$, CFI = .94, RMSEA = .06, and it did not show a significant loss of fit compared to the

unconstrained model, $\Delta\chi^2(5) = 45.67$, $p = .34$. Therefore, the structural relationships between our three predictors and environmentally responsible behavior were not significantly moderated by national context.

3.2. Longitudinal analyses

Despite the important results provided by our correlational analysis, a key limitation is its cross-sectional design, which does not allow us to infer the direction of the observed relations. Hence, we sought to rectify this, thereby conducting longitudinal analyses spanning three waves of data collection over a two-year period.

All the constructs of interest were measured at T1, T2 and T3. Descriptive statistics and inter-correlations for all the study variables are shown in Table 2[7]. As in our cross-sectional model, we conducted structural equation modeling using MPlus 7.1 software (Muthén & Muthén, 2013) to assess our main hypotheses. We employed an autoregressive cross-lagged model (Finkel, 1995) to provide evidence for the direction of relations among the variables in our model. Each construct was regressed both on its own lagged score and on the lagged scores of the other constructs. All constructs were modeled as latent variables with three indicators for each construct, in order to account for measurement error (Finkel, 1995).

3.2.1. Measurement model. First we set up a four-factor multi-group measurement model for both countries where we constrained all the factor loadings to be equal across the waves and across samples. As suggested by Jöreskog (1979), we incorporated auto-correlated error terms for the observed indicators. We allowed all latent variables to covary freely. All factor loadings were significant ($p < .001$), with standardized values ranging from .56 to .93 in the UK and from

[7] Tables 1 and 2 may differ slightly regarding the correlations results for T1 data. That is due the fact that in Table 1 we reported the correlations for all participants that answered the questionnaires (UK = 958; Chile =

.52 to .89 in Chile, and the model showed a good fit to the data, $\chi^2(1080) = 1618.77$, $p < .001$, CFI = .96, RMSEA = .04, supporting invariance of the measurement model across samples and across waves. Therefore, we included the same constraints on the factor loadings in all structural models reported below.

3.2.2. Cross-lagged model. We then set up our main structural model to test our hypotheses. We started with a structural cross-lagged reciprocal model for our core variables (Finkel, 1995). In this model, we included covariances among our latent measures of life goals, worldviews, identification and behavior within each time point and lagged paths from each measure to all four measures at the successive time point. Thus, we allowed all the constructs to be represented as antecedents and/or consequences of all other constructs. To gain statistical power for our hypothesis tests, and because we did not expect differences in the path trajectories across waves, we constrained all the corresponding lagged paths to be equal between T1 and T2 and between T2 and T3 within each country. Hence, each of our hypotheses H1 to H3 is represented by a single parameter test for each national sample representing the combined effect from T1 to T2 and from T2 to T3. The model fit remained good: χ^2 (1112) = 1654.18, $p < .001$, CFI = .96, RMSEA = .04, and this model did not show a significant decrease in fit compared to a model where all structural paths were estimated freely, $\Delta\chi^2(32) = 35{,}52$, $p = .31$. Results are shown in Figure 3.[8]

We found that extrinsic (versus intrinsic) life goals was a significant negative lagged predictor (i.e. antecedent) of environmentally responsible behavior in the UK, $\beta = -.08$, $p < .01$.

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257). However, in Table 2, we reported only the results for those we answered the three wave of data (UK = 461; Chile = 76).

[8] Although the unstandardized paths were constrained to equality, it is to be expected that the corresponding standardized paths differ slightly. For simplicity, in the main text we report the standardized paths from T1 to T2. Standardized paths from T2 to T3 may be found in Figure 3.

In Chile, the corresponding effect was of higher magnitude, although it only reached marginal significance, $\beta = -.13$, $p = .07$, presumably due to the smaller Chilean sample size. In contrast, pro-environmental worldviews failed to significantly predict environmentally responsible behavior in our cross-lagged model either in the UK ($\beta = .00$, $p = .96$) or in Chile ($\beta = .08$, $p = .50$). Similarly, environmental identification did not significantly predict environmentally responsible behavior either in the UK ($\beta = -.04$, $p = .11$) or in Chile ($\beta = -.13$, $p = .11$). Thus, the results supported H1, but not H2 or H3.

Interestingly, we also found that environmentally responsible behavior was a marginal negative predictor of extrinsic (versus intrinsic) life goals, both in the UK ($\beta = -.06$, $p = .07$) and in Chile ($\beta = -.16$, $p = .10$), providing suggestive evidence of a bidirectional relationship between life goals and environmentally responsible behavior.

Additionally, in the UK only, environmentally responsible behavior positively predicted pro-environmental worldviews, $\beta = .11$, $p < .001$, and pro-environmental worldviews in turn positively predicted environmental identification, $\beta = .06$, $p < .05$. In contrast, only in Chile, we found that environmental identification positively predicted pro-environmental worldviews, $\beta = .31$, $p < .01$. No other prospective paths were significant.

Finally, we tested a model where we additionally constrained the paths of the three predictors of environmentally responsible behavior (extrinsic relative to intrinsic life goals; environmental worldviews and environmental identification) to be equal across samples. This model continued to show a good fit: $\chi^2(1116) = 1652.58$, $p < .001$, CFI = .96, RMSEA = .04. Moreover, the constrained model did not show a significant loss of fit compared to the preceding model with only loadings constrained, $\Delta\chi^2(36) = 33.8$, $p = .57$. Therefore, it may be concluded

that national context did not significantly moderate the prospective effects of life goals, worldviews and identification on pro-environmental behaviors.[9]

3.3. Supplementary analyses

3.3.1. Separating the six life-goals. In our main analyses, we modeled the Aspiration Index using a composite measure of intrinsic and extrinsic life goals. Therefore, it remains unclear whether the effects are carried by intrinsic goals, extrinsic goals or a combination of both. Thus, we conducted a follow-up cross-sectional analysis using T1 data only, in which we split the Aspiration Index into its six life goals (three intrinsic and three extrinsic). We created 6 latent variables using five observed indicators for each construct to test the predictive power of each of the six different goals. This analysis was limited only to the UK, since the sample size in this country is appropriate to run this more complex analysis.

Measurement model. First, we tested a nine-factor measurement model for the UK following the same procedures as previously. All factor loadings were significant ($p < .001$), with standardized values ranging from .44 to .88. The model showed a marginally acceptable fit to the data, $\chi^2(666) = 2596.91$, $p < .001$, CFI = .89, RMSEA = .06. Hence, the results need to be considered with caution. Nonetheless, we decide to report these results, because they provide initial evidence about the relative importance of each of the six life goals in predicting environmentally responsible behavior.

Structural model. We set up a model in which all the six life goals (self-development, community involvement, relationships, money, fame and image), as well as pro-environmental worldviews and environmental identification, were allowed to predict environmentally

[9] We decided not to constrain the covariances between our predictors to be equal across samples, because the model showed a significant decrease in model fit, which is consistent with the results from our correlational model. However, when we constrained the covariances none of the main structural associations changed.

responsible behavior. We allowed the eight predictors variables to covary. This structural model was statistically equivalent to the measurement model, and so fit indices were identical.

Among the three intrinsic aspirations, community involvement was a significant positive predictor of environmentally responsible behavior ($\beta = .17$, $p < .01$), whereas neither self-development ($\beta = -.04$, $p = .58$) nor relationships ($\beta = .08$, $p = .11$) reached statistical significance. Among the three extrinsic aspirations, money was a significant negative predictor of environmentally responsible behavior ($\beta = -.28$, $p < .001$), whereas image did not reach statistical significance ($\beta = -.06$, $p = .20$). Unexpectedly, fame was a significant positive predictor of environmentally responsible behavior ($\beta = .14$, $p < .01$).[10] As in our main cross-sectional analysis reported earlier, pro-environmental worldview ($\beta = .35$, $p < .001$) and environmental identification ($\beta = .23$, $p < .001$) were both significant and positive predictors of environmentally responsible behavior.

3.3.2. Simpler longitudinal models. Our longitudinal analyses showed us some unexpected results in terms of the non-significant predictive effects of both environmental worldviews and environmental identification on environmental behavior. Therefore, we decided to test in both countries a new set of simpler models in order to be sure that the results were not compromised by statistical artifacts when we modeled all the environmental constructs together. Thus, in three further models, we decided to test the longitudinal associations of each of our three predictors on environmentally responsible behavior individually. We followed the same procedures as in our main longitudinal analyses. Thus, we will report only our main structural

[10] However, the zero-order correlation between fame aspirations and pro-environmental behaviour was non-significant, and fame did not significantly predict pro-environmental behaviour when the other two extrinsic aspirations were excluded from the model, suggesting that this unexpected result is a statistical artefact.

models where we constrained the loadings to be equal across time and country and all the corresponding lagged paths to be equal between T1 and T2 and between T2 and T3.

First, we tested the link between extrinsic (versus intrinsic) life goals and environmentally responsible behavior. The model fit was excellent: χ^2 (252) = 353.44, $p < .001$, CFI = .99, RMSEA = .04. As in our main analyses, extrinsic (versus intrinsic) life goals were a significant negative predictor of environmentally responsible behavior in the UK ($\beta = -.07$, $p < .05$) and in Chile ($\beta = -.16$, $p < .05$), while environmentally responsible behavior was a significant negative predictor of extrinsic (versus intrinsic) life goals in the UK ($\beta = -.06$, $p < .05$), but not in Chile ($\beta = -.05$, $p = .38$).

Second, we tested the link between pro-environmental worldviews and environmentally responsible behavior. The model fit was also excellent: χ^2 (252) = 386.69, $p < .001$, CFI = .98, RMSEA = .05. Congruent with our main results, pro-environmental worldviews did not predict environmentally responsible behavior, neither in the UK ($\beta = .00$, $p = .83$) nor in Chile ($\beta = .00$, $p = .97$). However, environmentally responsible behavior was a significant positive predictor of pro-environmental worldviews in the UK ($\beta = .09$, $p < .01$), but not in Chile ($\beta = .02$, $p = .89$).

Third, we tested the link between environmental identification and environmentally responsible behavior. The model fit was excellent: χ^2 (252) = 440.55, $p < .001$, CFI = .97, RMSEA = .05. Supporting our main results, environmental identification did not predict environmentally responsible behavior neither in the UK ($\beta = -.04$, $p = .16$) nor in Chile ($\beta = -.09$, $p = .27$). In addition, environmentally responsible behavior was a significant positive predictor of environmental identification in the UK ($\beta = .08$, $p < .01$), but not in Chile ($\beta = .08$, $p = .39$).

4. General Discussion

One of the biggest challenges the world faces in the 21st Century is that of climate change and global warming (United Nations Development Programme, 2007). If damaging human activities of over-consumption continue, global temperatures will increase significantly over the coming years, which would have serious implications for the well-being of current and future generations (Commission for Environmental Cooperation, 2002). Therefore, public policies and political campaigns urgently need to reduce environmentally unfriendly behavior, in order to protect the future of the world. To achieve this, policy makers first need to get an accurate understanding of the possible factors influencing people's environmental behaviors. Social psychologists have conducted valuable research regarding how we see, act, and behave toward our natural environmental, all with the idea to discover relevant pathways to prevent ecologically unfriendly behavior. However, most of the previous studies have focused on environmental attitudes and worldviews instead of individuals' life goals and included measures of behavioral intentions (e.g., Gatersleben, Jackson et al. 2012; Gatersleben et al. 2012) or responses to imaginary scenarios (e.g., Sheldon et al., 2011) instead of tapping into actual everyday behaviors. Therefore, if the world aims to tackle the current ecological crisis, the factors that relate to actual, everyday environmental behaviors need to be understood. That was the main goal of the current contribution.

4.1. Key Findings and Implications

Crucially, our research shows that, across time, life goals or aspirations are a more robust predictor than environmental worldviews or environmental identification of self-reported everyday environmental behaviors. Importantly, this finding was replicated across two very different sociocultural and economic contexts. Not only in the UK, a nation with a long-established mass consumer culture, but also in Chile, a developing nation, the endorsement of

extrinsic life goals, at the expense of intrinsic ones, was associated with less ecological behavior. In short, our results support the claim that a higher focus on external (materialistic) rewards is detrimental for limited natural resources. Being focused on extrinsic (vs. intrinsic) life goals would conflict with being interested in other people's welfare and with the future nature, which in turn may lead to less environmentally responsible behavior.

These findings may help policy makers to create new intervention strategies seeking to modify environmentally unfriendly behavior, especially as previous experimental research has shown that intrinsic and extrinsic life goals are at least somewhat malleable (e.g., Ku & Zaroff, 2014; Sheldon et al., 2011; Vansteenkiste et al., 2004). Even if "materialistic values will probably never be excised from the human psyche" (Kasser, 2015, p. 14:41), there are a key strategies that people and countries might follow in order to focus less on materialistic pursuits and, therefore, to protect the future of our planet. Kasser (2015) suggested activating and encouraging values and goals that are opposite to materialistic values and goals. When people focus on more intrinsic values (helping the community, connecting with others, and self-development), they tend to deprioritize extrinsic values (money, fame, and image). Therefore, public policies aiming to reduce current environmental problems should seek to encourage the pursuit of intrinsic and self-transcendent goals in everyday life.

Interestingly, we also found a marginal lagged effect in the opposite direction in both countries. Therefore, it seems that behaving pro-environmentally may lead to an increase in intrinsic (vs. extrinsic) life goals. Although these marginal effects are in need of replication, this raises the interesting possibility of a mutually reinforcing relationship between intrinsic (vs. extrinsic) life goals and environmentally responsible behavior, giving further hope that life goals may be a promising arena for the development of future intervention strategies.

Although based only on our UK data, further analyses give some clues about which specific life goals may be most detrimental (a focus on money) and most beneficial (a focus on community involvement) for the environment. Such findings are congruent with the circumplex model of goal contents reported by Grouzet et al. (2005), who found that financial success and community contribution stand in the most diametrical relation to each other. As a result, it is sensible that these two – most opposing – life goals carry the greatest predictive power for pro-social behaviors such as protecting the environment. Moreover, community contribution, because of its close ties to Schwartz' (1992, 2006) value of universalism, is likely to be most predictive of outcomes that involve societal importance such as environmental behavior. Importantly, though, the model that included these specific life goals only showed a marginally acceptable fit to the data, and the results need to be considered with caution. Nonetheless, these refined insights are critical to know whether people should better downplay their materialistic ambitions in their lives or rather pursue intrinsic goals more intensively and, if so, which intrinsic and which extrinsic goals they can better focus on.

Surprisingly, our results suggested that pro-environmental worldviews, as well as environmental identification, might be better understood as consequences rather than as antecedents of environmentally friendly behavior. Thus, among the UK participants, environmentally responsible behavior predicted pro-environmental worldviews, which in turn predicted environmental identification. Two possible explanations may help us to understand these findings. First, self-perception theory (Bem & McConnell, 1970) suggests that "Individuals come to 'know' their own attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior and/or the circumstances in which this behavior occurs" (p. 23). Therefore, people may base their self-concepts and worldviews in part

on observing their own behavior in order to determine what kind of person they are. For example, it could be that people see themselves behaving pro-environmentally, and as a result they form worldviews and identities to match their behavior. Second, the theory of cognitive dissonance (Festinger, 1964) states that when a person becomes aware of inconsistencies between her/his attitudes and behavior, people may try different ways of restoring consistency. For example, in order to feel that their behavior is consistent with their attitudes and identities, people may sometimes change their attitudes and identities to fit the behavior. Thus, it could be that people see themselves not behaving pro-environmentally, and this leads them to move towards a less pro-environmental worldview and identity that rationalizes their behavior.

In our Chilean sample, we found that environmental identification positively predicted pro-environmental worldviews. This supports previous claims that environmental identification—by reflecting whether or not people experience the environment as a central part of who they are—may therefore motivate or reduce their attitudes and behavior toward the environment (Gatersleben et al., 2014). However, it is notable that this effect did not extend to pro-environmental behavior and that it was not replicated in our much larger UK sample.

The greater predictive power of life goals, over environmental worldviews and identification, is all the more striking considering that life aspirations are situated at a global level, whereas the environmental predictors are situated at a domain-specific level of abstraction (Vallerand, 1997). In principle, this should have increased the chance of finding significant effects of the latter predictors, given that the outcome was also assessed at the same level of domain-specificity. Nonetheless, our results showed that it was life goals, rather than environmental worldviews and environmental identification, that prospectively predict environmental behavior.

4.2. Limitations and Future Directions

Although the current research produced interesting new insights, several limitations need to be acknowledged. First, our measure of environmentally responsible behaviors was self-reported, and it would be desirable to complement this with observational data, especially as the validity of self-report measures of pro-environmental behavior has sometimes been questioned (Kormos & Gifford, 2014). Nonetheless, the behaviors measured in our index were all relatively concrete, making it easier for participants to give reasonably objective responses. Moreover, if participants' self-reports were substantially biased by self-enhancement, one might expect that bias to be closely linked to environmental identification; yet, the effects of life goals were observed here while controlling for environmental identification. Crucially, a study using an earlier version of our current measure of pro-environmental behavior showed excellent correlations of self-reported behavior with observed behavior recorded by trained observers (r = .81: Kaiser, Frick, & Stoll-Kleeman, 2001).

Second, given that our participants were all university graduates, we should be cautious about generalizing these findings to poorer and less educated groups. Nonetheless, understanding the antecedents of environmentally unfriendly behavior among relatively affluent individuals may be especially important, given that these individuals have greater financial means to engage in over-consumption of natural resources.

Third, despite our strong evidence showing that extrinsic (versus intrinsic) life goals are a temporal antecedent of environmentally responsible behavior rather than vice versa, our longitudinal design still does not rule out the possibility of a third, unmeasured variable that influences both constructs. Nonetheless, our results considerably strengthen the case for a causal path from life goals to environmentally responsible behavior, not only because they establish

temporal precedence but also by controlling for the possible influence of two key potentially competing predictors: pro-environmental worldviews and environmental identification.

Fourth, we acknowledge that the Chilean sample size would ideally have been larger to increase our statistical power, and thus the Chilean results need to be considered with caution. In the current study, we found only one significant difference between the samples – the covariance between life goals and environmental identification. However, we should acknowledge that our Chilean sample was underpowered to detect cross-cultural differences, and so we should not rule out the possibility that there may be some other differences that we did not detect. Nonetheless, the goal of examining two samples in this study was not to look for cross-cultural differences but to test the replicability of our main findings across these two very different socio-economic and cultural contexts. Results from our Chilean sample provide initial evidence about the negative effects of pursuing extrinsic (versus intrinsic) life goals in a non-Western society, but it is important to recognize that the prospective effect of life goals on self-reported pro-environmental behavior only reached marginal significance in this sample, when controlling for environmental attitudes and identification. Thus, there remains a pressing need to test the replicability of this finding using larger samples and in other non-Western and developing societies.

Finally, future research could examine whether the predictors tested here are differentially related to ecology-damaging behaviours (e.g., littering) and pro-ecological behaviors (e.g. recycling). Theoretically, one might hypothesize that extrinsic life-goals would predict ecology-damaging behaviors, whereas intrinsic life goals would predict pro-ecological behaviors, in the same way that intrinsic and extrinsic life goals are differentially related to forms of psychological well-being and ill-being (Unanue et al., 2014). However, our current measure of pro-environmental behaviors does not allow for a clear separation between positive and

damaging behaviors; instead, the majority of behaviors captured can be viewed as choices between more or less damaging alternatives (e.g., *I ride a bicycle or take public transportation to work or school; I buy convenience foods*) which does not allow one to make a conceptual distinction between ecology-damaging behaviors and pro-ecological behaviors. Indeed, we caution future researchers not to impose an overly rigid or artificial distinction between positive and negative environmental behaviors, as this might lead to a focus on exceptional behaviors, but possibly ignore a large proportion of everyday behaviors that involve choosing between more or less positive or damaging alternatives.

4.3. Conclusion

Our current consumer culture tells us every day that material rewards and extrinsic life goals are the pathways to happiness and well-being. However, extending previous research showing that a higher relative importance attached to extrinsic life goals is negative for people's well-being (see meta-analysis by Dittmar et al., 2014), we have shown that this materialistic way of living is also dangerous for the future of our natural world. Through correlational and longitudinal evidence, we found support for arguments that attaching a higher importance to the pursuit of extrinsic (relative to intrinsic) life goals has more wide-ranging negative consequences than previously acknowledged. Extrinsic (versus intrinsic) life goals negatively affect not only people's personal well-being, but they also lead to more environmentally unfriendly behaviors. Indeed, the effect of life goals turned out to be more robust than those of two highly plausible alternative predictors: environmental worldviews and environmental identification. Therefore, policy makers need to pay special attention to the role of our current consumer culture in order to protect the future of the globe, encouraging people to live a more intrinsic and meaningful life (Brown & Kasser, 2005). Contemporary societies need to change from a materialistic way of

living to a more sustainable way of living. We hope this research helps to develop public policies that teach people how to live in harmony with nature and how to protect our natural world for the benefit of future generations.

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Table 1. Descriptives and Inter-Correlations Between All Study Variables in the UK and Chile (Correlational Data)

	M	SD	2	3	4	5	6
UK participants (N = 958)							
1. Extrinsic (versus intrinsic) life goals (E/I)	-1.48	.60	-.22**	-.36**	-.28**	-.16**	-.12**
2. Environmental worldviews	3.74	.55		.39**	.40**	.13**	.07*
3. Environmentally responsible behaviour	3.54	.56			.38**	.19**	.02
4. Environmental identification	3.79	.92				.18**	.12**
5. Gender (female percentage)	59%						-.13**
6. Age	44.68	13.98					
Chilean participants (N = 257)							
1. Extrinsic (versus intrinsic) life goals (E/I)	-1.34	.67	-.10	-.24	-.02	-.19**	-.11
2. Environmental worldviews	3.80	.47		.29**	.43**	.16**	.04
3. Environmentally responsible behaviour	3.02	.63			.36**	.17**	.03
4. Environmental identification	4.03	.88				.11	.11
5. Gender (female percentage)	53%						-.09
6. Age	34.81	10.54					

† p < .10, * p < .05, ** p < .01, *** p < .001

Table 2. Descriptives and Inter-Correlations Between All Study Variables in the UK and Chile (Longitudinal Data)

	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	14
UK participants (N = 461)															
1. Extrinsic (versus intrinsic) life goals (E/I) T1	-1.50	.58	.83**	.76**	-.22**	-.26**	-.18**	-.36**	-.37**	-.32**	-.28**	-.25**	-.28**	-.16**	-.12**
2. Extrinsic (versus intrinsic) life goals (E/I) T2	-1.51	.58		.84**	-.19**	-.23**	-.18**	-.33**	-.37**	-.33**	-.25**	-.27**	-.28**	-.15**	-.10*
3. Extrinsic (versus intrinsic) life goals (E/I) T3	-1.54	.57			-.18**	-.23**	-.20**	-.32**	-.31**	-.31**	-.22**	-.25**	-.28**	-.16**	-.08*
4. Environmental worldviews T1	3.73	.56				.77**	.77**	.39**	.36**	.33**	.40**	.41**	.38**	.13**	.07*
5. Environmental worldviews T2	3.70	.58					.80**	.38**	.35**	.30**	.33**	.41**	.35**	.07	.03
6. Environmental worldviews T3	3.71	.56						.38**	.36**	.32**	.33**	.40**	.41**	.05	.02
7. Environmentally responsible behaviour T1	3.57	.54							.82**	.75**	.38**	.38**	.35**	.19**	.02
8. Environmentally responsible behaviour T2	3.62	.54								.83**	.36**	.39**	.36**	.16**	.00
9. Environmentally responsible behaviour T3	3.62	.53									.28**	.31**	.29**	.13**	.01
10. Environmental identification T1	3.84	.91										.69**	.67**	.12**	.12**
11. Environmental identification T2	3.80	.94											.76**	.12**	.10*
12. Environmental identification T3	3.82	.94												.01*	.15**
13. Gender (female percentage) T1	59%														-.13**
14. Age T1	45.10	14.06													
Chilean participants (N = 76)	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	16
1. Extrinsic (versus intrinsic) life goals (E/I) T1	-1.43	.68	.65**	.78**	-.10	-.16	-.08	-.24**	-.30**	-.35**	-.02	-.10	-0.12	-.19**	-.11
2. Extrinsic (versus intrinsic) life goals (E/I) T2	-1.39	.68		.87**	-.09	-.31**	-.07	-.23*	-.33**	-.30**	-.10	-.15	-0.17	-.17	-.07
3. Extrinsic (versus intrinsic) life goals (E/I) T3	-1.45	.71			-.08	-.24*	-.17	-.18	-.33**	-.29**	.05	-.13	-0.16	-.11	-.16
4. Environmental worldviews T1	3.83	.48				.62**	.52**	.29**	.41**	.31**	.43**	.25**	.31**	.16**	.04
5. Environmental worldviews T2	3.72	.47					.54**	.25**	.38**	.39**	.36**	.34**	.32**	.06	.01
6. Environmental worldviews T3	3.70	.53						0.13	.31**	.24**	.26**	.38**	.45**	.09	.00
7. Environmentally responsible behaviour T1	2.97	.65							.67**	.74**	.36**	.32**	.31**	.17**	.03
8. Environmentally responsible behaviour T2	3.22	.67								.76**	.31**	.41**	.46**	.27**	.00
9. Environmentally responsible behaviour T3	3.20	.67									.36**	.44**	.33**	.07	.15
10. Environmental identification T1	3.91	.88										.63**	.60**	.11	.11
11. Environmental identification T2	3.89	.82											.69**	.01	.32
12. Environmental identification T3	3.86	.82												-.02	.15
13. Gender (female percentage) T1	47%														-.09
14. Age T1	36.87	10.21													

† p < .10, * p < .05, ** p < .01, *** p < .001

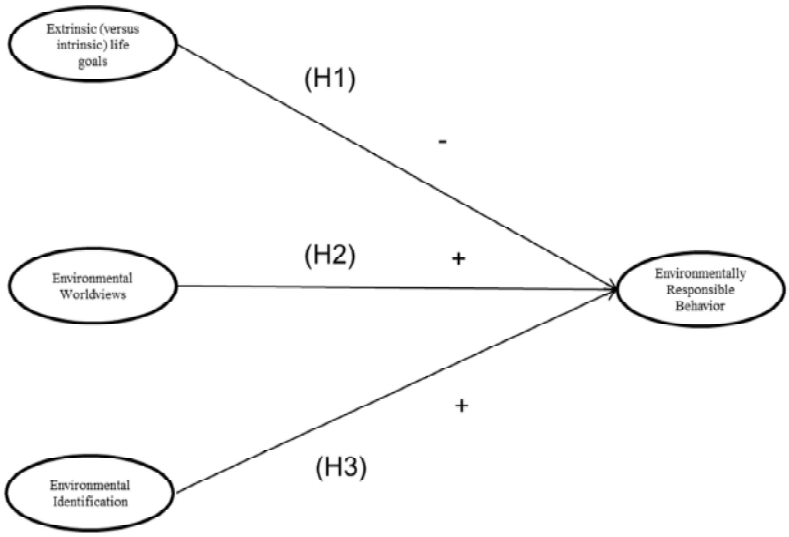
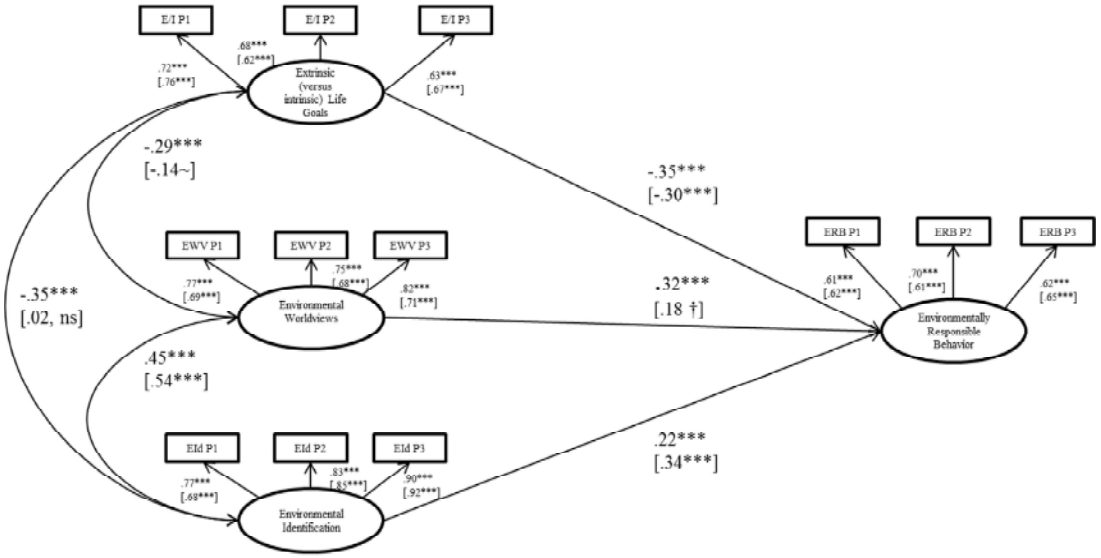
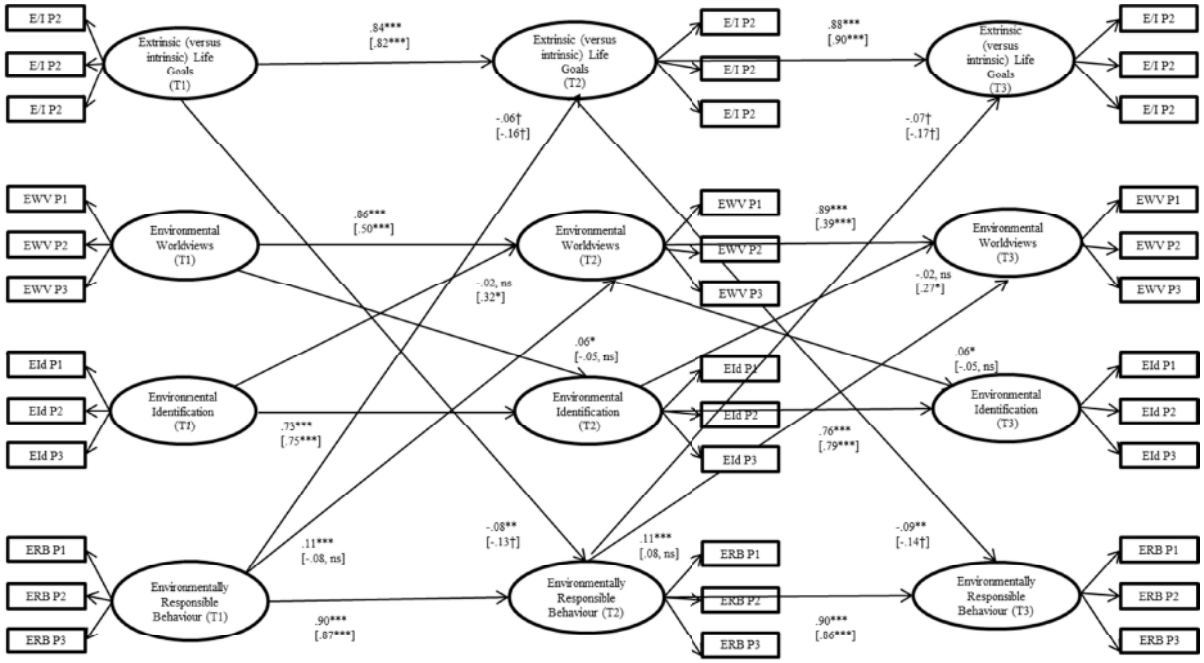


Figure 1. Structural model for the hypotheses about the links between extrinsic (versus intrinsic) life goals, environmental worldviews, environmental identification and environmentally responsible behaviour in the UK and Chile.



$X^2(112) = 372{,}914$, $p < .001$; CFI = .95; RMSEA = .06

Figure 2. Structural multigroup model for the associations between extrinsic (versus intrinsic) life goals, environmental worldviews, environmental identification and environmentally responsible behavior in the UK and Chile. Coefficients shown are standardized paths. Chilean coefficients are in brackets. Error terms are not shown to enhance visual clarity. E/I = Extrinsic (versus intrinsic) life goals; EWV = Pro-Environmental worldviews; EId= environmental identification; ERB = environmentally responsible behavior; Pi = parcel (i); † p < .10, * p < .05, ** p < .01, *** p < .001.



χ^2 (1112) = 1654,18, $p < .001$; CFI = .96; RMSEA = .04

Figure 3. Cross-lagged multigroup model for the associations between extrinsic (versus intrinsic) life goals, environmental worldviews, environmental identification and environmentally responsible behavior in the UK and Chile. Coefficients shown are standardized paths. Chilean coefficients are in brackets. Error terms and items loadings are not shown to enhance visual clarity. Factor loadings were all acceptable ranging from.58 to .93 in the UK and from .54 to .89 in Chile. Covariances between our core variables in T1 and covariances between the residuals terms of the latent variables in T2 and T3 are also not shown to enhance visual clarity. Paths are shown only when there are at least one significant or one marginal path in any country. E/I = Extrinsic (versus intrinsic) life goals; EWV = Environmental worldviews; EId= environmental identification; ERB = environmentally responsible behavior; ti = wave time (T1 = wave 2010; T2 = wave 2011; and T3 = wave 2012); Pi = parcel (i); † p < .10, * p < .05, ** p < .01, *** p < .001.

Highlights

- Intrinsic (vs. extrinsic) life goals predict environmentally responsible behaviour.
- This is shown in a mass consumer society (UK) and a developing nation (Chile).
- Longitudinal data over 2 years supports a prospective link.
- Findings persist when controlling for environmental worldviews and identification.
- Fostering intrinsic (vs. extrinsic) life goals may benefit future generations.

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